

Application No. 10/609,490

Amendment Date April 12, 2006; Reply to Office action of January 23, 2006

Remarks/Arguments

Applicant appreciates the helpful feedback received from Examiner Myint in the "Detailed Action" Office communication mailed January 23, 2006.

Claim Rejections – 35 USC §112

Claims 21 and 28 are cancelled.

Claim Rejections – 35 USC §102 and 35 USC §103

The primary object of the invention is to automatically generate and reveal computer discovered latent features and cues to a human. A second objective of the invention is to present the information to a human by ranking, clustering and searching for contrasting cases and transforming them into appropriate representation for effective visualization. A third object of the invention is to allow human feedback to incrementally update the discovered features and cues for human refined knowledge. A forth object of the invention is to validate human discovered latent features or cues for efficient confirmation or rejection of human hypotheses. The essence of the invention is the use of an enhanced regulation tree to accomplish the objectives. This essence of invention is patentably over all the cited prior arts.

The claims are amended to add limitations to reflect the essence of the invention. The detailed remarks are discussed for each claim as follows:

Claim 1

- (1) We added limitation in step b to add "the initial knowledge model is an enhanced regulation tree deriving and storing additional statistics at each node allowing incremental update of rules and multi-level abstraction visualization".
- (2) We added limitation in step c (original step d) to add knowledge presentation output "containing
 - i. Ranks for the rules associated with each of the tree terminal nodes,
 - ii. Contrast examples for each terminal node,
 - iii. Associated feature distribution profiles for each non-terminal node."

The use of the enhanced regulation tree with additional statistics as the knowledge model is distinctively different from the decision tree model taught in Heytens et al. that does not support incremental update as well as multi-level abstraction visualization. Furthermore, the knowledge presentation enhancement to the regulation tree is unique and patentably different from prior arts.

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Claim 2 is canceled

Claim 3

We added limitation to clearly states information integration “using global characteristics and population characteristics” and listed the detailed characteristics to differentiate from Heytens et al. and Perrizo.

Claim 4

We added limitations stating “a feature is normalized and weighted ranked and the ranks of the samples for the feature are prepared for quick feature visualization.” This clearly differentiate the invention from the cited prior art of Heytens et al. and Bay.

Claims 5-6 are canceled

Claim 7

- (1) We added limitation in step b to add “the initial knowledge model is an enhanced regulation tree deriving and storing additional statistics at each node allowing incremental update of rules”.
- (2) We added limitation in step c to clarify presentable knowledge model “facilitating interaction with human by rule prioritization, clustering, and contrast example selection wherein contrast examples are selected from samples of similar characteristics that match the selected rule yet have distinctively different labels.”

The use of the enhanced regulation tree with additional statistics as the knowledge model is distinctively different from the decision tree model taught in Heytens et al.

Claims 8-13 are canceled

Claim 14

- (1) We added limitation in step b to add “the initial knowledge model is an enhanced regulation tree deriving and storing additional statistics at each node allowing incremental update of rules”.
- (2) We added limitation in step c to clarify overview “wherein overview uses a shallower enhanced regulation tree created by pruning the deep tree or simply limiting the depth of the tree and combining all nodes beyond the depth limit.”

The added limitations are distinctively different from Heytens et al. and Arning et al.

Claim 15

We added limitations stating “zoom and filter allow certain branches of the enhanced regulation tree to expand following user direction.” This clarifies the zoom and filter are

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for enhanced regulation tree visualization and has clearly differentiated the invention from the cited prior art of Heytens et al. and Arning et al.

Claims 16-17 are canceled

Claim 18

We added limitation in step c for the feature profiles “wherein a feature is normalized and weighted ranked and the ranks of the samples for the feature are prepared for quick feature visualization.” This clarifies the feature profiles and has clearly differentiated the invention from the cited prior art of Heytens et al., Perrizo and Bay.

Claim 19

We added limitation that “contrast examples are selected from samples of similar characteristics that match the selected rule yet have distinctively different labels.” This clarifies the contrast examples and has clearly differentiated the invention from the cited prior art of Heytens et al., Perrizo, Bay, and Pea et al.

Claim 20

We added limitation to Local counts, Local population statistics, Global counts, and Global population statistics. This clarifies the global characteristics and population characteristics and has clearly differentiated the invention from the cited prior art of Heytens et al., Perrizo, Bay, Pea et al, and Savasere et al.

Claim 21 is canceled

Claim 22

We added limitation stating “normalized features are weighted ranked and the ranks of the samples for each feature are prepared for quick feature visualization wherein the weighted ranked process ranks a sample and uses its weight to generate a feature histogram.”

This clarifies feature normalization and has clearly differentiated the invention from the cited prior art of Heytens et al., Perrizo, Bay, and Knight.

Claim 23

We amended the claim step b stating “Remove rule by updating the samples of the rule associated terminal node yet does not update the samples of the rule associated non-terminal node.”

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This clarifies the essence of the tree update learning of the invention and has clearly differentiated the invention from the cited prior art of Heytens et al and Birdwell et al.

Claims 24-25 are canceled

Claim 26

We added limitation to add a rule stating “wherein an artificial sample with the feature values match the rule is created and is given high weight subject to the decision tree decision.”

This further clarifies the essence of the tree update learning of the invention and has clearly differentiated the invention from the cited prior art of Heytens et al, Birdwell et al., and Edwards et al.

Claim 27

(1) We added limitation on presentable knowledge model in step a to add “the presentable knowledge model is an enhanced regulation tree deriving and storing additional statistics at each node”.

(2) We added limitation in step b to clarify the essence of the invention for tree visualization “wherein the path from the root node through non-terminal nodes toward a terminal node is presented and the weight of a sample is highlighted by the thickness of the line.”

The added limitations are distinctively different from Heytens et al. and Keim.

Claims 28-29 are canceled

Claim 30

We added limitation to multi-level abstraction stating “wherein a regulation tree with sufficient depth is created as the baseline knowledge model. In the overview mode, a shallower tree is used that could be created by pruning the deep tree or simply limiting the depth of the tree and combining all nodes beyond the depth limit. In the zoom and filter mode, certain branches of the trees could be allowed to expand following user direction. In the details-on-demand mode, the deepest branch of the tree that corresponds to human interest is shown.”

This clarifies the essence of the multi-level abstraction of the invention and has clearly differentiated the invention from the cited prior art of Heytens et al. and Arning et al.

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Conclusion

In view of the amendments and above remarks and arguments, applicant submits that amended claims are patentably over the prior art and all claim rejections under 35 USC §112, 35 USC §102 and 35 USC §103 are overcome. Therefore Applicant submits that this application is in condition for allowance, which action Applicant respectfully solicits.

Conditional Request for Constructive Assistance

If for any reason this application is not believed to be in full condition for allowance, Applicant respectfully requests the constructive assistance and suggestions of the Examiner pursuant to MPEP para. 707.07(j) in order that the undersigned can place this application in allowable condition as soon as possible and without the need for further proceedings.

Respectfully submitted,



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